IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPEAL FROM THE EXAMINER TO
THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Kevin David Potter

Application No.:   10/532,438

Filing Date: December 28, 2005

Examiner: Nathan J. Bloom

Art Unit: 2624

Confirmation No.:   9117

For: POSITIONAL MEASUREMENT OF A FEATURE WITHIN AN

                             IMAGE

VIA EFS-WEB
MAILSTOP: APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Dear Sir:

Pursuant to 37 C.F.R. § 41.41(a)(1), this Reply Brief is filed within two months from the mailing date of the Examiner's Answer and contains the following items in compliance with 37 C.F.R. § 41.41 and M.P.E.P. 1208:

I.	Status of Claims
II.	Grounds of Rejection to be Reviewed on Appeal
III.	Argument
IV.	Conclusion

I.   STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 22 claims pending in the application.

B. Current Status of Claims

   i.   Claims canceled: 1-60, 65, 68, 73-76, and 78-89

   ii.   Claims withdrawn from consideration but not canceled: None

   iii.   Claims pending: 61-64, 66-67, 69-72, 77 and 90-99

   iv.   Claims allowed: None

   v.   Claims rejected: 61-64, 66-67, 69-72, 77 and 90-99

C. Claims On Appeal

The claims on appeal are Claims 61-64, 66-67, 69-72, 77 and 90-99.

II.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether the Examiner erred in rejecting Claims 61-64, 66-67, 69-72, 77 and 90-99 under 35 U.S.C. § 103(a), as being obvious over U.S. Patent No. 5,280,530 (hereinafter "Trew") in view of U.S. Patent No. 6,483,538 (hereinafter "Hu").

III.   ARGUMENT

Claims 61-64, 66-67, 69-72, 77 and 90-99 under 35 U.S.C. § 103(a) are not obvious over Trew in view of Hu.

A.   Confusion and lack of clear articulation as to what element of Hu teaches a "feature" as claimed by Applicant.

In the Examiner's Answer, the Examiner has modified certain statements as compared with statements set forth in the Final Office Action dated February 19, 2009. For example, the Examiner has now made different statements regarding where he considers a "feature" of Claim 61 to be taught by Hu. In view of new statements made in the Examiner's Answer, there is a lack of clear articulation as to exactly which feature of Hu is considered to equate to the "feature" defined in Claim 61.

In view of the lack of clear articulation, Applicants will address two scenarios below, showing that, in neither scenario does Hu teach or suggest Applicant's claimed invention. Applicant wishes to reiterate that Trew also does not teach or suggest Applicant's claimed invention for the reasons set forth in the Appeal Brief.

Applicant first wishes to reiterate that Hu expressly describes a system for aligning a test image 26 with a reference image 24. Both test and reference images (26, 24) may be considered to include a plurality of pixels. Hu then defines a texture 25 within test image 26, which is aligned with texture 25 in reference image 24 by overlaying a "test block" 28 on each image (24 and 26). Thus, test block 28 may move relative to test image 26 meaning that test block 28 moves *relative to both:* (a) the pixels of test image 26 <u>and</u>; (b) the texture 25 within test image 26.

B.   Scenario 1: Assumption that the "feature" as claimed equates with the pixels of reference image 24 that are bounded by test block 28 of reference image 24

In the Examiner's Answer (bottom of page 4), the Examiner states, "to determine the position of *the feature contained in the reference image block*" [emphasis added] and further states, "of the position of *the reference feature (represented by the reference block)*"

[emphasis added]. Based on said statements, one interpretation is that the Examiner considers the claimed "feature" to be the pixels of reference image 24 that are bounded by test block 28 of the reference image 24. It is important to first note that these pixels contain texture 25. In addition, texture 25 is also present in test image 26 although, within test image 26, texture 25 in not completely contained within test block 28 of test image 26.

In the Examiner's Answer (page 5), the Examiner further addresses the above discussion of the claimed "feature" by stating, "…translating the feature relative to the pixels …in the method of Hu *the reference block containing the feature is shifted in relation to the pixels of the target image…*" Here, however, it is clear that when reading the Hu reference, Hu expressly teaches shifting test block 28 of test image 26. Importantly, the contents of test block 28 of the test image 26 (i.e., pixels) do not move with any such shift. Instead, test block 28 of test image 26 will simply choose a group of pixels of test image 26 to correlate with texture 25 (the feature) contained in test block 28 of reference image 24 (which, it is also noted, never moves). Consequently, when Hu shifts test block 28 of test image 26 it is not *translating the feature relative to the pixels* because the "feature" of Hu (i.e., texture 25 defined by pixels of reference image 24 that are bounded by test block 28 of reference image 24) does not move relative to any pixels. This is an important distinction between Hu and Applicants claimed invention because a step of translating the feature (whose coordinates are being estimated) relative to the pixels by the claimed value is distinct and different from Hu and enables, with Applicant's claimed method, a more accurate subsequent estimate to be made.

C.   Scenario 2: Assumption that "feature" as claimed equates with test block 28

In a telephone interview with the Examiner on September 13, 2010, the Examiner stated that he considered test block 28 of Hu to equate to the "feature" defined in Claim 61. Taking this interpretation, it will be shown below that Hu does not describe the claimed invention, at least with respect what is discussed below, which is a review of elements as described in Claim 61.

i)   Hu does not describe *"determining an estimate of the coordinates of the feature to within a fraction of a pixel"* as claimed in Claim 61.

In view of the position taken by the Examiner that test block 28 of Hu equates with the "feature" defined in claim 61, it is further pointed out that Hu expressly teaches applying a fast Fourier transform (FFT) to the pixels of images 22, 24 that lie within respective test blocks 28 and thereafter cross correlate in the FFT domain. The result of such a cross correlation is an estimate of a <u>translation of the feature</u> (test block 28) that will result in the bounded area of each test block 28 looking the same. Thus, the result of said cross correlation of Hu is an estimation of a translation, and <u>not</u> an estimate of coordinates, because at the time the cross correlation is performed, the Hu "feature" (i.e., test block 28 of the test image 24) does not actually exist at the coordinates that it should be translated to in order to result in the highest level of correlation between the areas bounded by the respective test blocks 28. It is clear by Hu that it does not perform a correlation with respect to the feature, itself, and as such is <u>not</u> able to determine an estimate of the coordinates of the feature. Rather, Hu teaches correlating with respect to an area bounded by "the feature" defined in claim 61 and, consequently, is estimating a translation.

ii)   Hu does not describe *"translating the feature relative to the pixels such that the sum of the pixel fraction of the initial estimated coordinates and the pixel translation is an integer value"* as claimed in Claim 61.

Hu translates test block 28 that is on test image 24 by a pixel shift position value (referred to as X_A, Y_A). This is contrasted with Applicant's invention, in which a method (e.g., Claim 61) described that the feature is translated by either a negative value equating to "the estimate of the sub-pixel coordinates," or a positive value equating to "1- the estimate of the sub-pixel coordinates." Applicant's invention is further described on page 12, lines 6 to 10: "the re-sampled pixels will now look more like the reference feature as the re-sampling process approximately models the aliasing effects illustrated in Figure 2." Accordingly, if the feature defined in claim 61 was positively translated by the pixel shift position values X_A, Y_A

as is described in Hu (rather than by Applicant's claimed pixel translation), it could, in fact, worsen the aliasing effects on the feature.

When reviewing Hu, shifting test block 28 of Hu does <u>not</u> enable a further, more accurate estimation of the coordinates of the feature to be determined. This is because the underlying pixels of test image 24 (i.e., the subject of the cross-correlation) do <u>not</u> change when moving test block 28. Consequently, any aliasing effects present in test image 24, which may affect the accuracy of the cross-correlation, cannot be modeled by shifting test block 28.

iii)   Hu does not describe "*determining a further estimate of the coordinates of the translated feature within the image to within a fraction of a pixel*" or "*determining a refined estimate of the feature coordinates by summing the pixel fraction of the previous estimate of the coordinates with the further estimate of coordinates,*" as claimed in Claim 61.

As noted above in section (a), Hu does not describe estimating the coordinates of the feature, but rather a translation for the feature and, therefore, Hu is also not capable of "*determining a refined estimate of the feature coordinates by summing the pixel fraction of the previous estimate of the coordinates with the further estimate of coordinates,*" as claimed in Claim 61

D.   Claims 61-64, 66-67, 69-72, 77 and 90-99 are not obvious over Trew in view of Hu.

The key to supporting any obviousness rejection is a clear articulation of the reason why the claim would have been obvious (*KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007)). *In Re Ravi Vaidyanathan* (2009-1404, Fed. Cir. 2010) held that an Examiner is responsible for explicitly setting forth factual findings of obviousness. It was stated that there must be a persuasive explanation with evidentiary support as to <u>how</u> a person would select and apply the teaching(s) of each reference as well as a thorough reasoning with support as to <u>why</u> a person

of ordinary skill would select and combine various features from different references to arrive at the stated conclusion. It was further held that if such support could not be found in the prior art, then the Examiner may "choose instead to provide an affidavit detailing the examiner's own personal knowledge (as a person approximating one of ordinary skill in the art) of the technology in question." Applicants respectfully submit that neither the factual findings for obviousness nor an affidavit have been provided and, thus, the burden for providing a *prima facie* showing of obviousness has not been met. The required clear articulation has not been provided. Instead, statements made by the Examiner are inconsistent, which gives rise to doubt and uncertainty that claimed invention is obvious.

With reference to Claim 61, the elements as claimed cannot be found in Hu or Trew. Therefore, neither Hu nor Trew, when taken alone or in combination, teach or suggest the claimed invention. Similar arguments can be made with regard to Claims 32-64, 66-67, 69-72, 77 and 90-99.

The Examiner's Answer focused on: (i) the issue of estimating coordinates of a feature to within a fraction of a pixel; and (ii) the issue of the sum of the pixel fraction and pixel translation value being an integer value. Applicant respectfully submits that such positions cannot be considered in isolation because they are linked to other important elements of the claimed invention, such as translating the feature relative to the pixels, which was not addressed in the Examiner's Answer.

In summary, if the Examiner's position is that the "feature" of Hu is in accordance with Scenario 1, Applicants have shown that Hu does not perform a translation of the feature relative to the pixels. If the Examiner's position is that the "feature" of Hu is in accordance with Scenario 2, Applicants have shown that Hu does not, at least, perform an estimation of the coordinates of the feature.

E.   Clarity of claim.

During a telephone interview with the Examiner on September 13, 2010, it was discussed that Claim 61 contains a lack of antecedence when reciting, "...by a pixel

translation value, wherein the sum..." Applicants believe this may be easily addressed by way of an Examiner's Amendment to change the underlined "the" to "a."

IV.   CONCLUSION

In view of the errors noted above with regard to the Examiner's rejection of claims 61-64, 66-67, 69-72, 77 and 90-99, Applicant earnestly request that the Board of Patent Appeals and Interferences reverse the final rejection of the Examiner and instruct the Examiner to issue a notice of allowance as to all claims.

Dated: December 6, 2010

Respectfully submitted,

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